

# Mass Evacuation and Our Nation's Highways

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## Abstract

Americans use the interstate highway system as a means of escape from natural disasters, but these roads may offer false hope with regard to escaping terrorist attacks. Such disasters require a different and creative approach to prevent chaos and the overuse of the highway system in evacuating metropolitan regions which could potentially lead to other harmful consequences.

## Marshalling Eisenhower

Although not as glamorous as battlefield heroics, visionary logistical planning is often the key to victory. Just as it is crucial in conventional warfare, this leadership attribute will determine the success or failure of public preparedness and response in the current climate of war and terrorism.

Two important Americans, George Marshall and Dwight Eisenhower, provide illustrative examples. During World War I, then-Lt.Col. Marshall identified nodes of transportation and communication along the route to the Argonne in order to very quickly relay 660,000 troops and their supplies (Goldhurst, 1977). Marshall understood the possibilities of the transportation infrastructure, and he used logistical planning to assure major Allied victories in France. His evaluation of roadway capacity, during a critical time and amid unprecedented events, showed that victory on the

battlefield could be achieved largely through preparation and planning.

Dwight Eisenhower's travels over rough roads as a young officer, and his later experience with the German autobahn during World War II, led him as President to support the development of an interstate highway system in the 1950s. The highway system was initially developed with defense purposes in mind. Eisenhower envisioned a modern network of highways across the continental U.S. that could serve civilians during peacetime but

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could also accommodate aircraft on strategic runways and transport troops between strategic outposts in times of war.

The expansive U.S. highway system may at first glance seem to be a very appropriate mechanism for evacuation and self-preservation in the event of a terrorist attack. However, while a mass movement of troops in World War I solved a great problem for George Marshall, massive movement

of civilians in the current war on terror is not so much a solution as a potential risk. It may be that the most valuable transport after a weapon of mass destruction (WMD) attack will be the delivery of necessary provisions and services to communities in order to enhance their resilience and ability to remain intact.

#### *The Role of the U.S. Highway System*

For better or worse, our highway system has stood as a model for the world, sparking a cloning of similar transportation networks in industrialized and developing countries alike. As the greatest transportation infrastructure project ever tackled by the Federal government, our vast, maintained, and seamless interstate highway system is a testament to Eisenhower's vision half a century ago. However, a closer look reveals cracks in the pavement. Extensive usage by commuters and commercial vehicles has caused our interstates to be overcrowded and dangerous (see Figure 1).



**Figure 1. Congestion on highways from evacuees fleeing a terrorist attack could put even more of the population at risk.** *Photo by Erik Malkemus.*

Furthermore, much of the current interstate system in the United States is rather archaic, since it does not yet fully integrate car and driver with the road by using the latest information technology such as Intelligent Transportation Systems (ITS). ITS refers to the confluence of information technology and transportation systems. Intelligent Transportation Systems have been heralded as the solution to many of our current and future transportation challenges. For example, Smart Roads, as they are often called, can boast video cameras, sensors, and the latest wireless communication systems. However, entrenched state highway departments, incompatible standards, insufficient regional cooperation, immature technology, and large costs have limited the application of ITS. Although funding has increased for pilot projects and research involving Smart Roads, their greatest benefits do not yet directly accrue towards homeland security.

While no longer the most modern or safe, our system of highways and interstates is still looked upon as a

secure place to ensure a "fast getaway." It is this feature, in fact, that may attract anxious citizens to rush to the roads in mass evacuations in the event that our cities are attacked with weapons of mass destruction.

### **Evacuation as Solution**

According to the dictionary, the definition of "evacuation" is the "organized, phased, and supervised dispersal of people from dangerous or potentially dangerous areas" (Glossary of Disaster Management, no date). The concept of evacuation may seem simple, but in the context of national security, it is an umbrella term encompassing various procedures and detailed planning. Ideally, an evacuation order would constitute a responsible directive that leadership provides to a population facing grave danger within its community. This type of evacuation can be voluntary or mandatory, depending on the seriousness of the threat. In other words, when other alternatives are not safer, a responsible leader directs a responsive population to depart from the current location in order to move to a safer specified location.

Knowing Eisenhower's keen appreciation of the dual needs of citizens and the military in times of war, this concept of targeted evacuation is consistent with his vision. Citizens would benefit from the orderly departure from an area of greater danger to an area of less danger, while the military would be able to utilize the highway system in order to protect national security. This has often proven to be the case during natural disasters. However, past successes with evacuation for natural disasters may provide a false sense of security in the use of the highway during future unnatural disasters.

### *Evacuation during Natural Disasters*

Over the past five decades, government leaders have improved upon their ability to communicate with the public in a way to target evacuation for specific populations that are otherwise subject to grave dangers posed by floods, fires, and the like. Although natural disasters are often dramatic events, citizens most often respond in logical, rational ways, and they will not only make rational choices for themselves, but will often assist fellow citizens in collaborative and even altruistic ways. Research demonstrates that panic in *natural* disasters is extremely rare. This, in part, may be due to the amount of time people have to prepare themselves for an evacuation. Often, the threat of a natural disaster (such as a hurricane) is picked up in advance and information is dispersed in a timely manner (Peek, 2003). Even in the case of earthquakes, where there is no warning, structural engineering has evolved to mitigate some of the havoc that serious quakes can unleash. While valuable in understanding known threats, this research tells us little about our response to threats that are unnatural and occur with little or no advance notice.

### *Shadow Evacuation during Unnatural Disasters*

Thankfully, the world's experiences with unnatural disasters involving radiation, chemical, and biological weapons are extremely limited up to this point in time. However, a review of unnatural disasters at home and abroad belies less cause to be sanguine about expected public responses. We do know that in the Three Mile Island nuclear reactor incident, unnecessary evacuation—known as shadow evacuation—occurred. In this instance, individuals who were outside of the perimeter of



contamination also chose to evacuate, thereby clogging the transportation arteries at a time when they were most needed by those who were within the contaminated area. During a 1997 chemical spill in West Helena, Arkansas, although 90 percent of those who were told to evacuate did so, an additional 32 percent chose to evacuate after they were instructed to shelter in place (Oak Ridge, 2002). This converse of evacuation, sheltering in place, consists of "selecting an interior room or rooms within your facility, or ones with no or few windows, and taking refuge there. In many cases, local authorities will issue advice to shelter in place via TV or radio" (U.S. Department of Labor, 2005).

### *Spontaneous Evacuation*

Targeted evacuation has an evil twin that has rarely surfaced in our experience with natural or even unnatural disasters. Known as spontaneous evacuation, it is the stuff of dramatic action films. Complete with ineffectual government officials and hysterical citizens, the scene of spontaneous evacuation is a true goal of terrorists, since it represents societal entropy; a chaotic situation that impacts the economy, the inability for government to adequately access its existing infrastructure, and ultimately, the public's disconnection from government. Spontaneous evacuation occurs when "residents or citizens in the threatened areas observe an emergency event or receive unofficial word of an actual or perceived threat and without receiving instructions to do so, elect to evacuate the area. Their movement means, and direction of travel, is unorganized and unsupervised" (Glossary of Disaster Management, no date). A spontaneous evacuation can be ultimately deleterious to the government's goal of protecting citizens and

transporting victims in need of healthcare. Therefore, government plans for evacuation after a natural disaster may not prove effective in the case of a terrorist attack.

### **Planning for Unnatural Disasters**

How can communities prepare for unnatural disasters? The issues of public response involve complex logistics. The key to a safe and successful public response is preparation. Without prior planning, we may provide an all too anticipated response to an attack.

### *Surge Capacity and Surge Suppression*

In order to appreciate our infrastructure's vulnerability, we can look to the capacity of metropolitan highways. Surge capacity is traditionally a medical concept which refers to the point at which caring for patients overstresses the health care system's ability to comfortably provide patient care. Just as we speak about surge capacity in terms of health care and its ability to meet peak needs, we can apply issues of surge to our transportation system. The traditional view of surge capacity that looks only at static resources, such as hospital beds, is not sufficient in planning for potential terrorist events. A modern understanding of surge capacity requires us to look at resource availability in a dynamic, interdependent way. In the flow of a crisis, it is important to understand not only the issue of surge capacity but also the issues of surge suppression. For the purpose of this article, the concept of surge suppression (a term borrowed from electronics), refers to the means to prevent damage or overload to critical infrastructure during transient spikes in usage. Surge suppression is a

complementary concept central to a more complete understanding of surge capacity. A thoughtful understanding of both surge capacity and suppression appreciates the dynamic interplay between physical, psychological, and social elements of critical infrastructure.

Critical infrastructure, whether referring to highways or hospitals, is often geographically based, tied to existing population density and predicated upon the ability of human resources to operate, maintain, and repair various aspects of that infrastructure during times of crisis.

In the event of terrorist attack, our critical infrastructure will be threatened if individuals choose to flee their communities rather than to remain. The stakes are enormous. If population density shifts through unplanned, spontaneous evacuation, population surges will create overloading spikes in resource utilization in areas that are ill equipped to handle the resultant stresses.

### *Community Shielding*

During the past two years, the Critical Incident Analysis Group (CIAG) has developed a concept called "community shielding" that has broad policy implications for public response to weapons of mass destruction attacks. This concept entails a pre-planned, community-wide, shelter-in-place response, with an emphasis on communication and delivery of essential services to affected populations.

In the event of a terrorist attack, individual and community responses will be the most important predictors of survival. Although there can be a natural inclination to flee from a disaster, in most

cases the wisest choice for survival will be to stay within one's own home or work community. The choice is complicated by the very success of our interstate highway system. Serving as a seductive route for evacuation, it can result in a static gridlock during a spontaneous evacuation, leaving citizens trapped and vulnerable in vehicles.

The decision to preserve our options by remaining in our home communities is known as community shielding, and it can serve to support our individual and community needs. By preparing community shielding plans, we may be able better match those in the area who need assistance with those best able to provide it. Community shielding is a means for the public to shelter in place and, if necessary, be supported in that status through the delivery of essential items. We know that coping with crisis is easier when we are in a stable environment. Knowing where we will sleep, eat, and receive information is comforting and beneficial, and these survival functions take on greater significance during a crisis (Saathoff, 2002). Better than any medication that we know, information treats anxiety during a crisis. When that information is trusted and from a local source, it is more likely that it will be specific to the needs of our community. When citizens are able to safely support their neighbors while engaging in community shielding, the needs of those Americans who are truly needy due to homelessness or isolation can be much more effectively addressed by targeted government, medical, faith-based, and other private sector services (Stein, in press).

Since each community is unique in its strengths and vulnerabilities, proactive planning for effective community shielding is necessary on a community-by-community basis. Service organizations such as

Citizens' Corps can facilitate this type of planning. Distribution and dissemination of Department of Homeland Security (DHS) and community specific information can be distributed through public sector channels (like schools) and private sector channels such as local shopping centers.

### *Implications for North Carolina*

The Tar Heel State is not as far removed from these scenarios as one might think. Major U.S. Army and U.S. Marine Corps installations reside in Eastern Carolina, and their emergency mobilization would occupy Interstates 95 and 40. Regarding Interstates 85 and 95, should an evacuation surge southwards from Washington D.C., North Carolina could feel its effects, particularly if the medical capabilities of the Triangle were in demand. Also, Charlotte is the nation's number-two financial center, following New York, whose financial prowess already has been a victimized target. While North Carolina may not be considered an obvious target for terrorist attacks, each state and local community should consider developing planning strategies to deal with the effects of unnatural disasters and the spontaneous evacuations that could arise in the wake of these events.

### **The Role of Leadership**

Leadership, top-down planning, and local-level planning are all essential for the development of adequate surge capacity within our critical infrastructure, whether it be related to transportation or healthcare. While this central aspect of Federal planning is vital, the physical, psychological, and social value of decentralization must not be overlooked. "Centralization of functions and

decision-making in the national government may also be poor counter-terrorism policies. Populations are better protected by redundancy than by centralization, since redundancy permits most units to continue functioning even after some are damaged or destroyed" (Terwillinger, 2003).

This redundancy is perhaps best represented by individual households, neighborhoods, and communities. As Barkun has described in his report entitled "Community Shielding and the Political System," the multiple layers of the shielding model consist of households, local communities, states and the Federal government. This complementary "bottom-up" strategy recognizes that households are the fundamental units in the event of a terrorist attack. The household's ability to manage the lives of its members is critical, and its success constitutes the "surge suppression" previously described. The next higher level of government, social, and medical resources should not be utilized during a crisis unless absolutely necessary (Barkun, 2002).

The Department of Homeland Security has made a commitment to partnering with stakeholders in public preparedness. Through development of homeland security strategies, the Department demonstrates an appreciation of the dynamic that exists between first responders, the government, and citizens. When cultivated, this enhances the development of effective grass roots tactics required by individual communities. To the extent that communities play the lead role in developing these plans, they will also own them.

## Conclusion

What can we learn from past wars? In order to accomplish his miraculous transport of troops to the Argonne in 1918, Lt.Col. George Marshall relied on the concept of redundancy and the delegation of leadership. To accomplish his mission, he supplied the vision and strategic plan and relied on officers posted in the field. Marshall credited the mission's success to the one thousand officers posted at strategic points along the routes. These officers demonstrated remarkable leadership in accomplishing the logistical feat of transporting more than a half million troops under dangerous conditions in record time.

The Department of Homeland Security continues to develop partnerships with community leaders who are placed strategically within vulnerable metropolitan areas. Their actions will be the determining factor in the preparation and response of citizens who suffer a terrorist attack from weapons of mass destruction. The promise of the distant future may reside in smart technology for highways and transportation systems. However, the demands of the present require that community leaders develop meaningful alternatives to evacuation such as community shielding, so that citizens can receive the support that they require in order to effectively shelter in place.

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